BRUSHWELLMAN
ENGINEERED MATERIALS

December 9, 1991

TO: GREG HAWKINS

FROM: JOE HARDY

SUBJECT: REVEGETATION PLOT STUDY

The purpose of this study is to examine the following:

- What relationship different topsoil depths over a rhyolite based understory has on the establishment and existence of range land plant reseedings.
- Which plants are best suited to survive and replenish in these reseeding areas that Brush Wellman, in the future, will be using for reseeding.
- Which way of distributing the seed will spread the seeds most evenly.

The test plot studies are being performed on the Section 16 dump site, due east of the Section 16 open pit mine. Test plots being on the Southern most part of that dump site. The study is performed on a rhyolite covered area of said dump. The study plot was broken into four plots, each plot consisting of an approximate top soil depth.

Test Plot #1 of the study had a depth of 0 inches of top soil,
Test Plot #2 of the study had a depth of 3 inches of top soil,
Test Plot #3 of the study had a depth of 6 inches of top soil and
Test Plot #4 of the study had a depth of 18 inches of top soil.

The individual test plot sizes were approximated by pace. At a later date, each individual plot will be surveyed for exact acreage and location. Approximate acreage of test plots is listed below:

Test Plot #1	.546 acres
Test Plot #2	.900 acres
Test Plot #3	1.214 acres
Test Plot #4	.291 acres

Plant seed species tested and amount of seed used for planting are as follows:

Scientific name	Common name	Lbs/acre
Oryzopsis hymenoides	Indian ricegrass	2.0
Melilotus officinalis	Yellow sweetclover	1.0
Atriplex canescens	Four-wing saltbrush	2.0
Atriplex confertifolia	Shadscale	2.0
Sitanion hystrix	Squirrel tail grass	2.0
Chrysothamnus nauseosus	Rabbit brush	3.0
Penstemon palmeri	Palmers penstamon	1.0
Ephedra nevadensis	Brigham tea	1.0

The amount of seed that was used was individually weighed out per plot and spread either by a herd seed spreader on the back of a four-wheeled-all-terrain vehicle, or hand broadcast by walking the plot.

The top four species of plants in the list above (Indian ricegrass, Yellow sweetclover, Shadscale and Four-wing saltbrush) seed were spread by the herd spreader. To prevent filtering of the smaller seeds of the Ricegrass and Sweetclover down through the Shadscale and Four-wing seeds, the seed was not mixed in the spreader together. Instead it was spread individually to attain a more even dispersement on each plot.

The bottom four species (Squirrel tail grass, Rabbit brush, Penstamon and Ephedra) seed, were also distributed individually, but were spread by hand. The breeze that day was from the NorthWest direction and the spreading went well, there was just enough breeze to assist in the spreading process.

After the topsoil was placed on the plots, they were renovated with a catapiller ripper to break up the hard rhyolite crust for better root penetration and filtration of the topsoil. We ripped again just before planting the plots to soften the seed bed for maximum seed and plant survival. No fertilizer, mulched hay or straw was used on these experimental seed plots. Once the seed was spread, we secured a tie to the catapiller and dragged is across the plot to cover the seed.

The seeding was done in mid-november while the weather was cool and the night time temperatures were in the thirties. The first real hard long-lasting freeze took place about a week and a half after the planting. This formed a hard upper crust of soil securing the seeds in place, so they could not be blown away by the winds that are a very natural and common experience in this region.

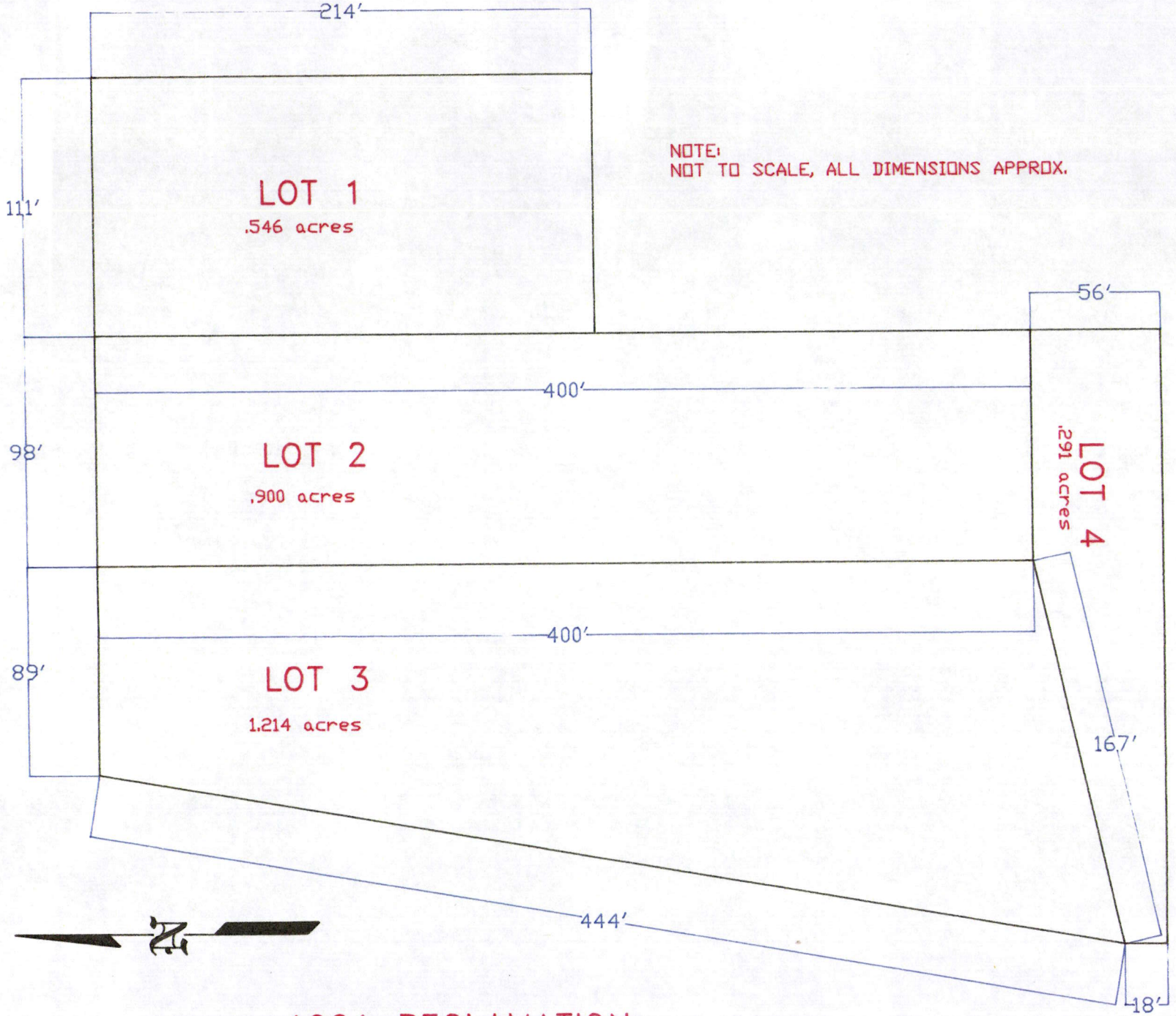
In the future for planned seed bed plantings, I feel that the herd spreader on the four-wheel-all-terrain vehicle is the best way to plant for the following reasons:

1) It's light and does not compact the soil that it drives over.
2) It's versatility to climb over and around rocks and crevices.
3) The time spent planting is maximized.
4) Seeds are spread more evenly.

Recommendations for future reseedings:

Have seed pre-weighed and ready to plant before starting to plant.

When the bin holding the seed gets close to being empty, the seed on the bottom will slosh around and cannot be distributed as evenly. Therefore, we should modify the bottom of the seed bin to an angle that feeds toward the opening that feeds the mechanism which spreads the seed.



1991 RECLAMATION
RESEEDING STUDY AREAS

ADDENDUM 2

TOPAZ MINING PROPERTY – MINING & RECLAMATION PLAN **ADDENDUM TO VOLUME 3, TABLE 2.4–1**
Disturbed Acreage, Existing and Proposed **As Per Aerial Photography Dated June 15, 1991**

Pit Complexes	Pits			Dumps				Reclaimed to MRP
	1988	Existing	Change	1988	Existing	Change		Pits / Dumps
Roadside 1&2	56.6	17.46 *	–39.14 backfill	113.6	57.23 V	–56.37	Tuff Rhyolite	No / Yes 92 / Variance
Blue Chalk North	19.6	20.64 *	1.04	24.4	19.04 V	–5.36	Tuff Rhyolite	No / Yes / Variance
Blue Chalk South	29.7	6.53 *	–23.17 backfill	69.0	46.26 R	–22.74	Tuff Rhyolite	No / Yes
Fluro	22.6	23.89 *	1.29	64.9	69.16 V	4.26	Tuff Rhyolite	No / Yes / Variance
Sigma Emma	26.7	24.19 V	–2.51	13.3 56.1	16.79 V 65.56 R	3.51 9.46	Tuff Rhyolite	Yes / Yes / Yes
Taurus	13.2	12.72 V	–0.48	33.3	36.35 R	3.05	Tuff Rhyolite	Yes / Yes
Rainbow	34.9	26.20 *	–8.70	58.0	58.07 R	0.07	Tuff Rhyolite	No / Yes
Roadside/Fluro 3	16.3 proposed	20.13 *	3.81	backfill	capped 106.15 *	106.15	Tuff Rhyolite	No / No
Section 16 North #1	10.7 proposed	26.34 *	15.64	backfill	84.06 *	84.06	Tuff Rhyolite	No / No
Monitor (Anaconda)	8.8	8.82 V	0.00	26.2	26.23 V	0.00	Tuff Rhyolite	Yes / Yes
Totals(Pits & Dumps)	239.1	186.92	–52.22	242.4 216.4 458.8	188.45 396.45 584.90	–53.96 180.05 126.09	Tuff Rhyolite Both	
Net Change of Acres Disturbed		73.87						

SUMMARY

Existing Acres		*Variance(V)*	*Reclaimed(R)*		** Existing MRP Balance*
Pits	*186.92 Acres*	*–45.73*	*0*	=	*141.19 Acres*
Tuff Dumps	*188.45 Acres*	*–188.45*	*0*	=	*0 Acres*
Rhyolite Dumps	*396.45 Acres*	*0*	*–206.24*	=	*190.21 Acres*
Misc.(roads, etc.)	*48.54 Acres*	*0*	*–11.20*	=	*37.34 Acres*
Total Disturbed	*820.36 Acres*	*–234.18*	*–217.44*	=	*368.74 Acres*

GGH/jw

18–Feb–9